Excel 2002

Unit B

Building

and Editing Worksheets

Objectives

- Plan and design a worksheet
- MOUS Edit cell entries
- MOUS Enter formulas
- MOUS Create complex formulas
- MOUS Introduce Excel functions
- MOUS Copy and move cell entries
- MOUS Understand relative and absolute cell references
- MOUS Copy formulas with relative cell references
- MOUS Copy formulas with absolute cell references

Using your understanding of Excel basics, you can now plan and build your own worksheets. When you build a worksheet, you enter labels, values, and formulas into worksheet cells. Once you create a worksheet, you can save it in a workbook file and then print it. The MediaLoft marketing department has asked Jim Fernandez for an estimate of the average number of author appearances this summer. Marketing hopes that the number of appearances will increase 20% over last year's figures. Jim asks you to create a worksheet that summarizes appearances for last year and forecasts the summer appearances for this year.

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Planning and Designing a Worksheet

Before you start entering data into a worksheet, you need to know the purpose and approximate layout of the worksheet. To increase store traffic and sales, MediaLoft encourages authors to come to stores and sign their books. Jim wants to forecast MediaLoft's 2003 summer author appearances. The goal, already identified by the Marketing department, is to increase the year 2002 signings by 20%. Using the planning guidelines below, work with Jim as he plans this worksheet.

Details

In planning and designing a worksheet it is important to:

Determine the purpose of the worksheet and give it a meaningful title

Jim needs to forecast summer appearances for 2003. Jim titles the worksheet "Summer 2003 MediaLoft Author Events Forecast."

Determine your worksheet's desired results, or "output"

Jim needs to begin scheduling author events and will use these forecasts to determine staffing and budget needs if the number of author events increases by 20%. He also wants to calculate the average number of author events because the Marketing department uses this information for corporate promotions.

Collect all the information, or "input," that will produce the results you want

Jim gathers together the number of author events that occurred at four stores during the 2002 summer season, which runs from June through August.

Determine the calculations, or formulas, necessary to achieve the desired results

First, Jim needs to total the number of events at each of the selected stores during each month of the summer of 2002. Then he needs to add these totals together to determine the grand total of summer appearances. Because he needs to determine the goal for the 2003 season, the 2002 monthly totals and grand total are multiplied by 1.2 to calculate the projected 20% increase for the 2003 summer season. He'll use the Average function to determine the average number of author appearances for the Marketing department.

Sketch on paper how you want the worksheet to look; identify where to place the labels and values

Jim decides to put the store locations in rows and the months in columns. He enters the data in his sketch and notes the location of the monthly totals and the grand total. Below the totals, he writes out the formula for determining a 20% increase in 2002 appearances. He also includes a label for the average number of events calculations. Jim's sketch of his worksheet is shown in Figure B-1.

Create the worksheet

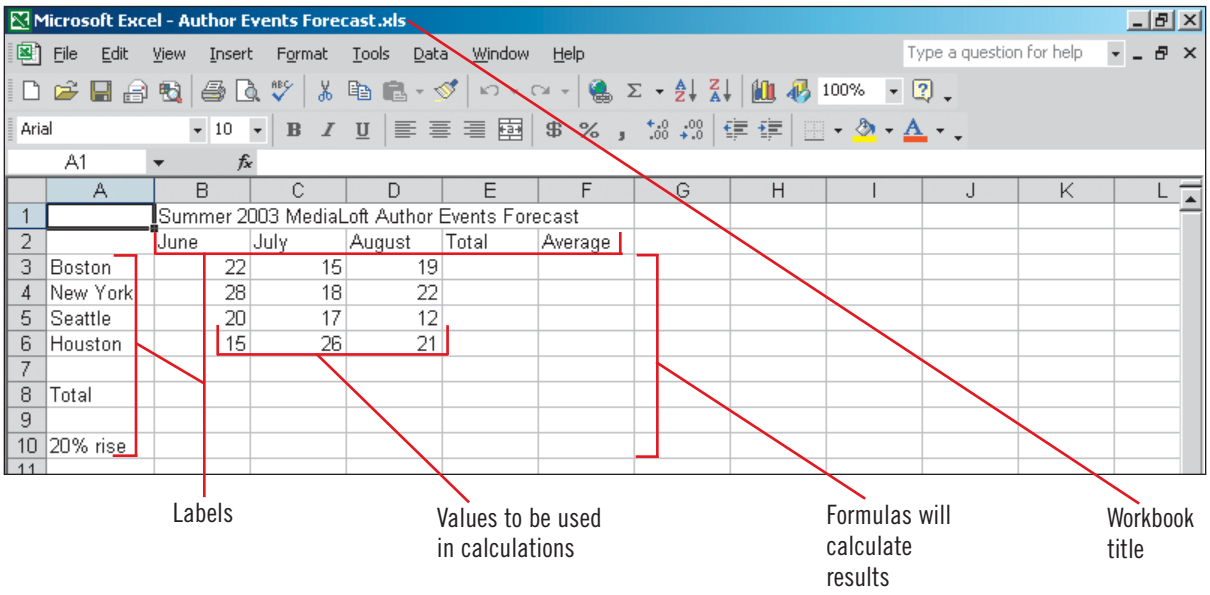
Jim enters the labels first, to establish the structure of the worksheet. He then enters the values—the data summarizing the events—into his worksheet. Finally, he enters the formulas necessary to calculate totals, averages, and forecasts. These values and formulas will be used to calculate the necessary output. The worksheet Jim creates is shown in Figure B-2.

FIGURE B-1: Worksheet sketch showing labels, values, and calculations

Summer 2003 MediaLoft Author Events Forecast

	June	July	August	Total	Average
Boston	22	15	19		
New York	28	18	22		
Seattle	20	17	12		
Houston	15	26	21		
Total	June Total	July Total	August Total	Grand Total	
20% rise	Total X 1.2				

FIGURE B-2: Jim's forecasting worksheet



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Editing Cell Entries

You can change the contents of a cell at any time. To edit the contents of a cell, you first select the cell you want to edit. Then you have two options: you can click the formula bar or press [F2]. This puts Excel into Edit mode. Alternately, you can double-click any cell and start editing. To make sure you are in Edit mode, look at the **mode indicator** on the far-left side of the status bar. After planning and creating his worksheet, Jim notices that he entered the wrong value for the August Seattle events, and that Houston should replace San Diego. He asks you to edit these entries to correct them.

Steps

QuickTip

In the Open dialog box, you can double-click the file-name to open the workbook in one step.

1. Start Excel, open the workbook **EX B-1** from the drive and folder where your Project Files are stored, then save it as **Author Events Forecast**

2. Click cell **D5**
   This cell contains August events for the Seattle store, which you want to change to reflect the correct numbers.

3. Click to the right of **12** in the formula bar
   Excel goes into Edit mode, and the mode indicator on the status bar displays "Edit." A blinking vertical line called the **insertion point** appears in the formula bar, and if you move the mouse pointer to the formula bar, the pointer changes to I, which is used for editing. See Figure B-3.

4. Press **[Backspace]**, type **8**, then click the **Enter button** on the formula bar
   The value in cell D5 is changed from 12 to 18, and cell D5 remains selected.

5. Click cell **A6**, then press **[F2]**
   Excel returns to Edit mode, and the insertion point appears in the cell.

QuickTip

The Undo button allows you to reverse up to 16 previous actions, one at a time.

6. Press **[Backspace]** nine times, type **Houston**, then press **[Enter]**
   The label changes to Houston, and cell A7 becomes the active cell. If you make a mistake, you can click the Cancel button on the formula bar *before* confirming the cell entry. If you notice the mistake *after* you have confirmed the cell entry, click the Undo button on the Standard toolbar.

7. Double-click cell **C6**
   Double-clicking a cell also puts Excel into Edit mode with the insertion point in the cell.

8. Press **[Delete]** twice, then type **19**
   The number of book signings for July in Houston has been corrected. See Figure B-4.

9. Click to confirm the entry, then click the **Save button** on the Standard toolbar

FIGURE B-3: Worksheet in Edit mode

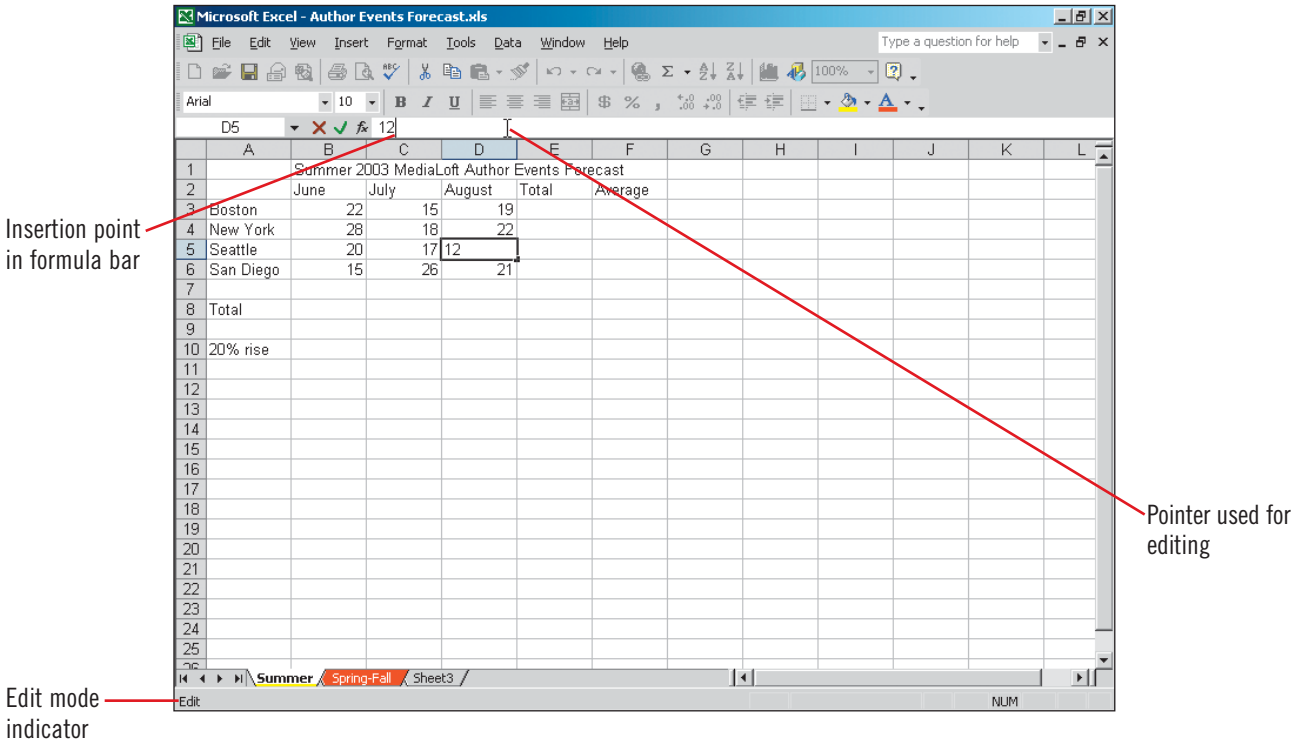
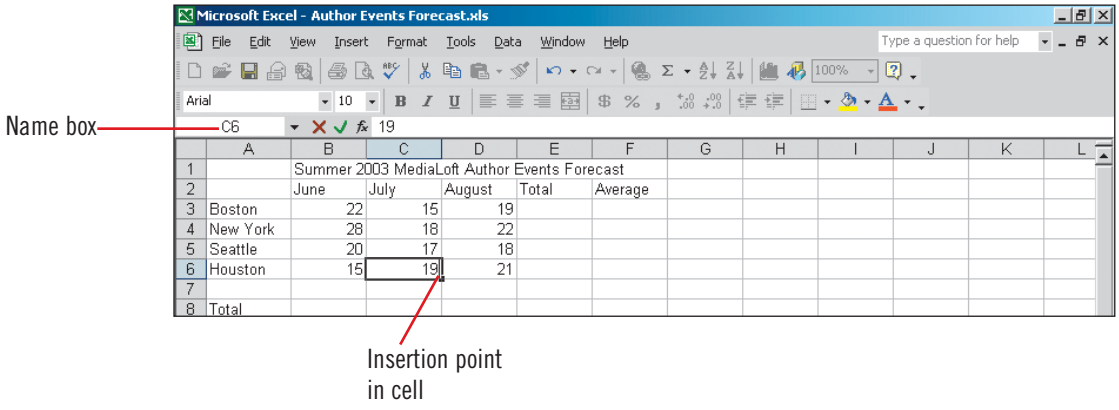


FIGURE B-4: Edited worksheet



Recovering a lost workbook file

Sometimes while you are using Excel, you may experience a power failure or your computer may "freeze," making it impossible to continue working. If this type of interruption occurs, Excel has a built-in recovery feature that allows you to open and save files that were open at the time of the interruption. When you restart Excel after an interruption, the Document Recovery task pane opens on the left side of your screen displaying both original and recovered versions of the files that were open. If you're not sure which file to open (original or recovered), it's usually better to open the recovered file because it will have retained the latest information. You can, however, open and review all the versions of the file that were recovered and save the best one. Each file listed in the Document Recovery task pane has a list arrow with options that allow you to open the file, save the file, delete the file, or show repairs made to the file.

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Entering Formulas

You use **formulas** to perform numeric calculations such as adding, multiplying, and averaging. Formulas in an Excel worksheet usually start with the equal sign (=), called the **formula prefix**, followed by cell addresses and range names. Arithmetic formulas use one or more **arithmetic operators** to perform calculations; see Table B-1. Using a cell address or range name in a formula is called **cell referencing**. If you change a value in a cell, any formula containing that cell reference will be automatically recalculated using the new value. Jim needs to total the values for the monthly author events for June, July, and August. He asks you to create formulas to perform these calculations.

Steps 1 2 3 4

1. Click cell **B8**
   This is the cell where you want to enter the calculation that totals the number of June events.

2. Type **=** (the equal sign)
   Placing an equal sign at the beginning of an entry tells Excel that a formula is about to be entered, rather than a label or a value. "Enter" appears on the status bar. The total number of June events is equal to the sum of the values in cells B3, B4, B5, and B6.

Trouble?
If you type an incorrect character, press [Backspace].

3. Type **b3+b4+b5+b6**
   Compare your worksheet to Figure B-5. Each cell address in the equation is shown in a matching color in the worksheet. For example, the cell address B3 is written in blue in the equation and is outlined in blue in the worksheet. This makes it easy to identify each cell in a formula.

Trouble?
If the formula instead of the result appears in the cell after you click ✓, make sure you began the formula with = (the equal sign).

4. Click the **Enter button** ✓ on the formula bar
   The result, 85, appears in cell B8. Cell B8 remains selected, and the formula appears in the formula bar. Excel is not case-sensitive: it doesn't matter if you type uppercase or lowercase characters when you enter cell addresses. Typing cell addresses is only one way of creating a formula. A more accurate method involves **pointing** at cells using the mouse, then using the keyboard to supply arithmetic operators.

5. Click cell **C8**, type **=**, click cell **C3**, type **+**, click cell **C4**, type **+**, click cell **C5**, type **+**, click cell **C6**, then click the **Enter button** ✓ on the formula bar
   When you clicked cell C3, a moving border surrounded the cell. This **moving border** indicates the cell used in the calculation. Moving borders can appear around a single cell or a range of cells. The total number of author appearances for July, 69, appears in cell C8. The pointing method of creating a formula is more accurate than typing, because it is easy to type a cell address incorrectly. Cell D8 also needs a total.

6. Click cell **D8**, type **=**, click cell **D3**, type **+**, click cell **D4**, type **+**, click cell **D5**, type **+**, click cell **D6**, then click the **Enter button** ✓ on the formula bar
   The total number of appearances for August, 80, appears in cell D8. Compare your worksheet to Figure B-6.

7. Click the **Save button** on the Standard toolbar

FIGURE B-5: Worksheet showing cells in a formula

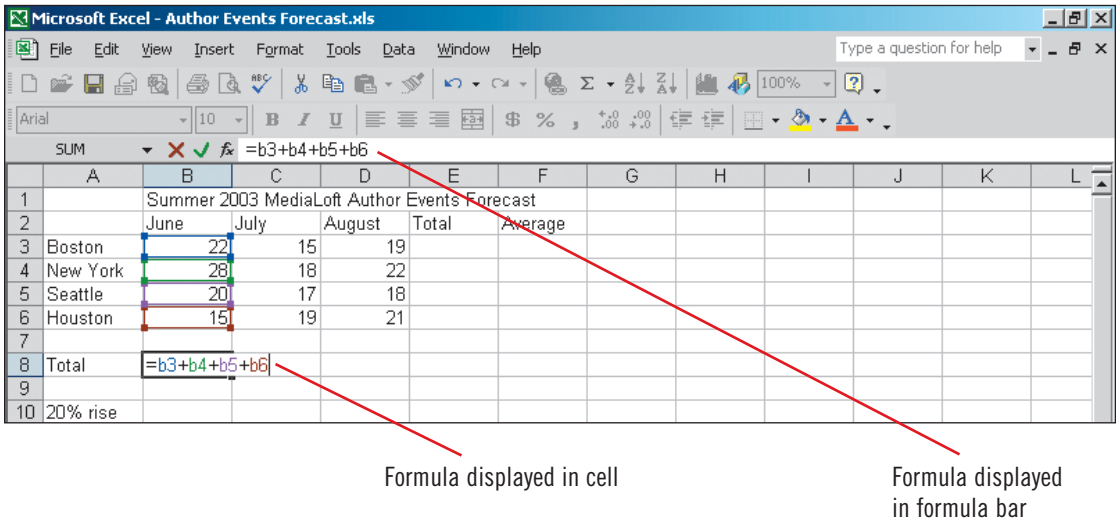


FIGURE B-6: Completed formulas

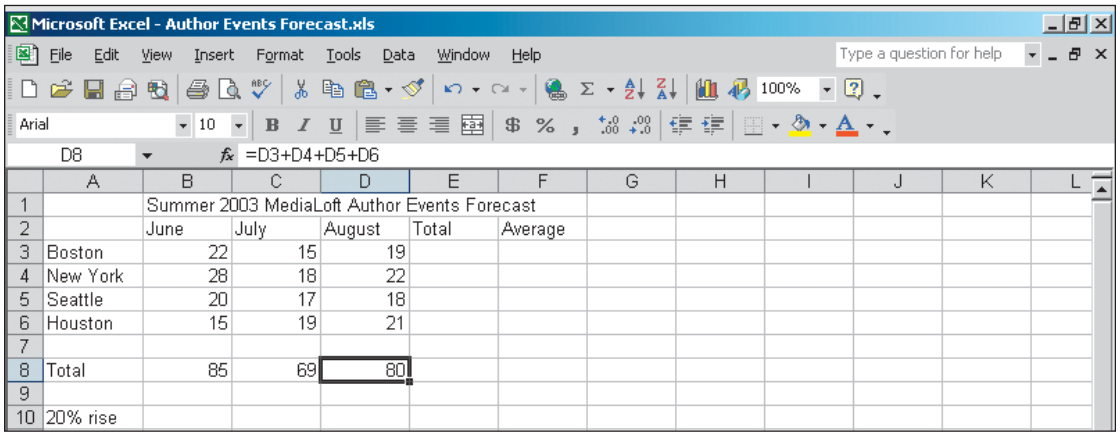


TABLE B-1: Excel arithmetic operators

operator	purpose	example
+	Addition	=A5+A7
–	Subtraction or negation	=A5–10
*	Multiplication	=A5*A7
/	Division	=A5/A7
%	Percent	=35%
^ (caret)	Exponent	=6^2 (same as 6^2)

Creating Complex Formulas

The formula you entered is a simple formula containing one arithmetic operator, the plus sign. You can create a **complex formula**—an equation that uses more than one type of arithmetic operator. For example, you may need to create a formula that uses addition and multiplication. You can use arithmetic operators to separate tasks within a complex equation. In formulas containing more than one arithmetic operator, Excel uses the order of precedence rules to determine which operation to perform first. Jim wants you to total the values for the monthly author events for June, July, and August, and forecast what the 20% increase in appearances will be. You create a complex formula to perform these calculations.

Steps

1. Click cell **B10**, type **=**, click cell **B8**, then type ***.2**
   This part of the formula calculates 20% of the cell contents by multiplying the June total by .2 (or 20%). Because this part of the formula uses multiplication, it will be calculated first according to the rules of precedence.

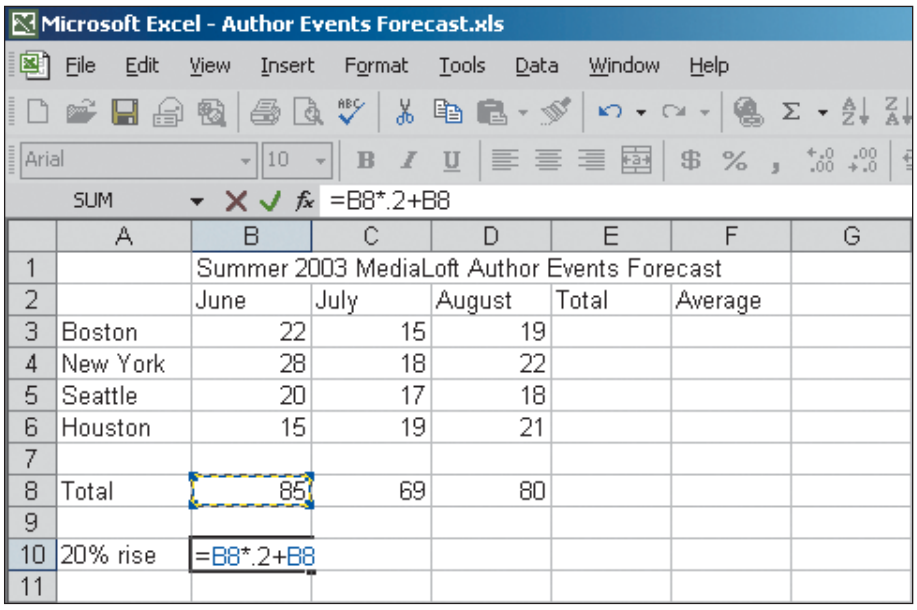
QuickTip
Press [Esc] to turn off a moving border.

2. Type **+**, then click cell **B8**
   The second part of the formula adds the 20% increase to the original value of the cell. The mode indicator says Point, indicating you can add more cell references. Compare your worksheet to Figure B-7.
3. Click ✓ on the formula bar
   The result, 102, appears in cell B10.
4. Click cell **C10**, type **=**, click cell **C8**, type ***.2**, type **+**, click cell **C8**, then click ✓
   The result, 82.8, appears in cell C10.
5. Click cell **D10**, type **=**, click cell **D8**, type ***.2**, type **+**, click **D8**, then click ✓
   The result, 96, appears in cell D10. Compare your completed worksheet to Figure B-8.
6. Click the **Save button** on the Standard toolbar

Editing formulas

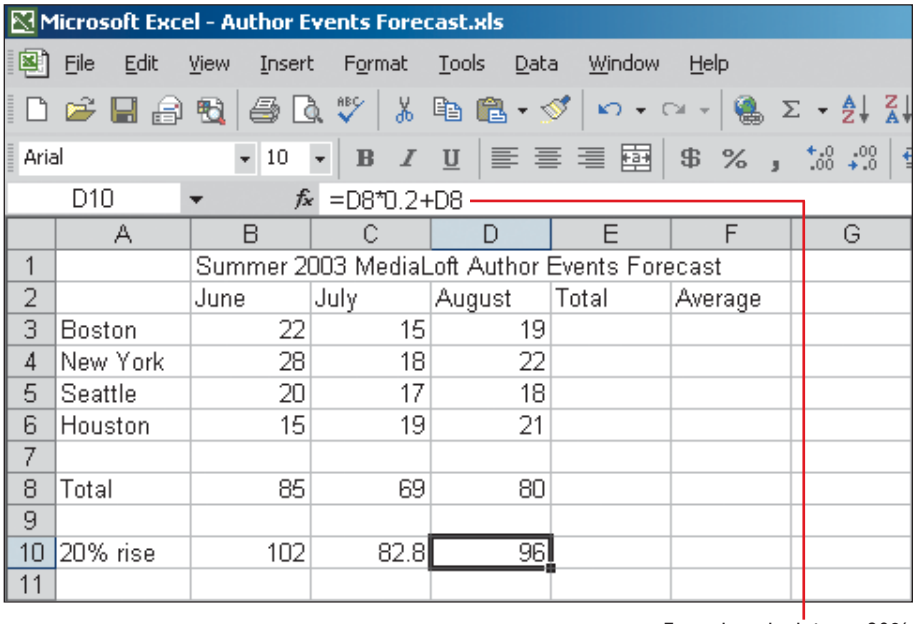
You can edit formulas the same way you edit cell entries: you can click the cell containing the formula then edit it in the formula bar; you can also double-click a cell or press [F2] to enter Edit mode, and then edit the formula in the cell. After you are in Edit mode, use the arrow keys to move the insertion point left or right in the formula. Use [Backspace] or [Delete] to delete characters to the left or right of the insertion point, then type or point to new cell references or operators.

FIGURE B-7: Elements of a complex formula



	A	B	C	D	E	F	G
1		Summer 2003 MediaLoft Author Events Forecast					
2		June	July	August	Total	Average	
3	Boston	22	15	19			
4	New York	28	18	22			
5	Seattle	20	17	18			
6	Houston	15	19	21			
7							
8	Total	85	69	80			
9							
10	20% rise	=B8*.2+B8					
11							

FIGURE B-8: Multiple complex formulas



	A	B	C	D	E	F	G
1		Summer 2003 MediaLoft Author Events Forecast					
2		June	July	August	Total	Average	
3	Boston	22	15	19			
4	New York	28	18	22			
5	Seattle	20	17	18			
6	Houston	15	19	21			
7							
8	Total	85	69	80			
9							
10	20% rise	102	82.8	96			
11							

Formula calculates a 20% increase over the value in cell D8 and displays the result in cell D10

Order of precedence in Excel formulas

A formula can include several mathematical operations. When you work with formulas that have more than one operator, the order of precedence is very important. If a formula contains two or more operators, such as 4+.55/4000*25, the computer performs the calculations in a particular sequence based on these rules: Operations inside parentheses are calculated before any other operations. Exponents are calculated next, then any multiplication and division—from left to right. Finally, addition and subtraction are calculated from left to right. In the example 4+.55/4000*25, Excel performs the arithmetic operations by first dividing 4000 into .55, then multiplying the result by 25, then adding 4. You can change the order of calculations by using parentheses. For example, in the formula (4+.55)/4000*25, Excel would first add 4 and .55, then divide that amount by 4000, then finally multiply by 25.

Introducing Excel Functions

Functions are predefined worksheet formulas that enable you to perform complex calculations easily. Like formulas, functions always begin with the formula prefix = (the equal sign). You can type functions, or you can use the Insert Function button to select the function you need from a list. The **AutoSum** button on the Standard toolbar enters the most frequently used function, SUM. A function can be used by itself within a cell, or as part of a formula. For example, to calculate monthly sales tax, you could create a formula that adds a range of cells (using the SUM function) and then multiplies the total by a decimal. Jim asks you to use the SUM function to calculate the grand totals in his worksheet and the AVERAGE function to calculate the average number of author events per store.

Steps 1 2 3 4

1. Click cell **E3**
   This is where you want the total of all Boston author events for June, July, and August.
2. Click the **AutoSum button** Σ on the Standard toolbar, then click the **Enter button** ✓ on the formula bar
   The formula =SUM(B3:D3) appears in the formula bar and the result, 56, appears in cell E3. By default, AutoSum adds the values in the cells above the cell pointer. If there are one or fewer values there, AutoSum adds the values to its left—in this case, the values in cells B3, C3, and D3. The information inside the parentheses is the **argument**, or the information Excel uses to calculate the function result. In this case, the argument is the range B3:D3.
3. Click cell **E4**, click Σ, then click ✓
   The total for the New York events appears in cell E4.
4. Click cell **E5**, then click Σ
   AutoSum sets up a function to add the two values in the cells above the active cell, but this time the default argument is not correct.

QuickTip

The ScreenTip 1R x 3C tells you the size of the range is 1 row and 3 columns.

5. Click cell **B5** and hold down the mouse button, drag to cell **D5** to select the range **B5:D5**, then click ✓
   As you drag, the argument in the SUM function changes to reflect the selected range, and a yellow Argument ToolTip shows the function syntax. You can click any part of the ToolTip to display Help on the function.
6. Click cell **E6**, type **=SUM(**, click cell **B6** and drag to cell **D6**, click ✓, click cell **E8**, type **=SUM(**, click cell **B8** and drag to cell **D8**, click ✓, click cell **E10**, type **=SUM(**, click cell **B10** and drag to cell **D10**, then click ✓
   Compare your screen to Figure B-9. Excel adds the closing parenthesis.

Trouble?

If the Office Assistant opens, click No, don't provide help now.

7. Click cell **F3**, then click the **Insert Function button** fx on the formula bar
   The Insert Function dialog box and Wizard opens. Here you can select a function from a list. See Table B-2 for frequently used functions. The function you need to calculate averages—named AVERAGE—appears in the Most Recently Used function category.

QuickTip

Modify a function's range by clicking the Collapse dialog box button, defining the range with your mouse, then clicking the Expand dialog box button to return to the Function Arguments dialog box.

8. Click **AVERAGE** in the Select a function list box, click **OK**; the Function Arguments dialog box opens; type **B3:D3** in the Number 1 text box, as shown in Figure B-10, then click **OK**
9. Click cell **F4**, click fx, verify that **AVERAGE** is selected, click **OK**, type **B4:D4**, click **OK**, click cell **F5**, click fx, click **AVERAGE**, click **OK**, type **B5:D5**, click **OK**, click cell **F6**, click fx, click **AVERAGE**, click **OK**, type **B6:D6**, then click **OK**
   The result for Boston (cell F3) is 18.66667; the result for New York (cell F4) is 22.66667; the result for Seattle (cell F5) is 18.33333; and the result for Houston (cell F6) is 18.33333, giving you the averages for all four stores.
10. Enter your name in cell **A25**, click the **Save button** on the Standard toolbar, then click the **Print button** on the Standard toolbar

FIGURE B-9: Worksheet with SUM functions entered

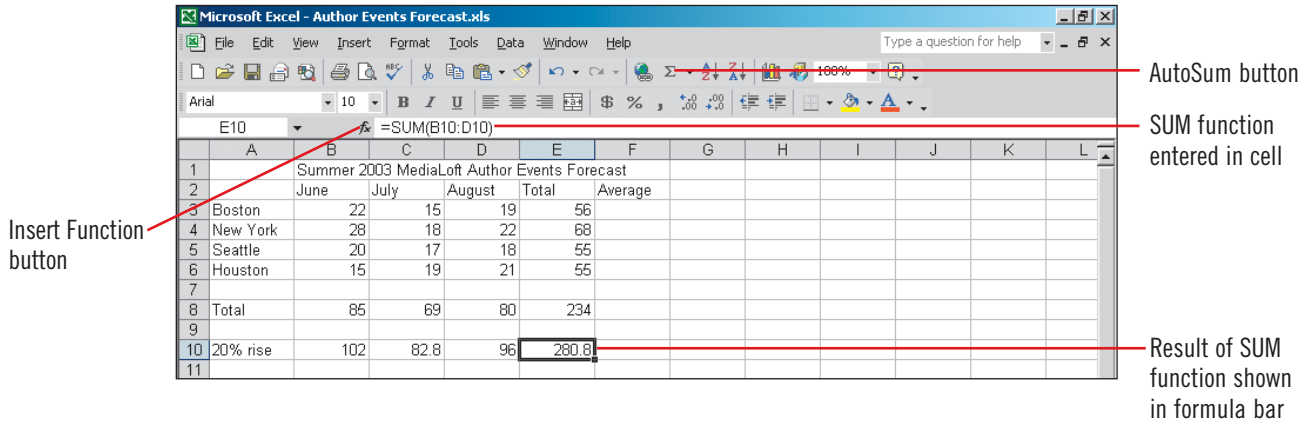


FIGURE B-10: Using Insert Function to create a formula

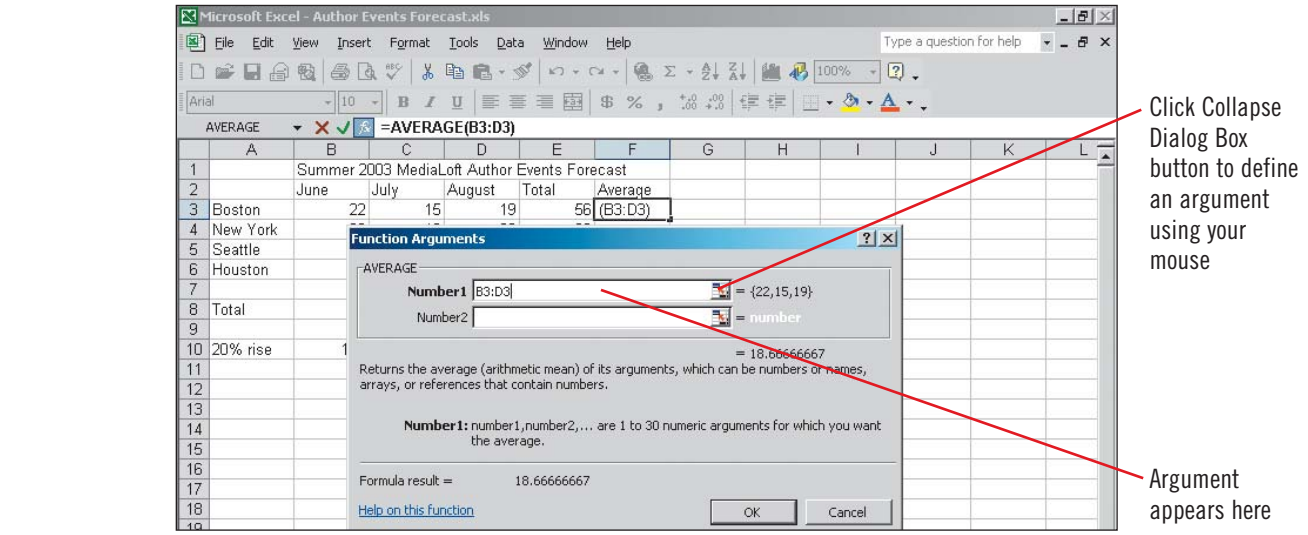


TABLE B-2: Frequently used functions

function	description
SUM (*argument*)	Calculates the sum of the arguments
AVERAGE (*argument*)	Calculates the average of the arguments
MAX (*argument*)	Displays the largest value among the arguments
MIN (*argument*)	Displays the smallest value among the arguments
COUNT (*argument*)	Calculates the number of values in the arguments

Using the MIN and MAX functions

Other commonly used functions include MIN and MAX. You use the MIN function to calculate the minimum, or smallest, value in a selected range; the MAX function calculates the maximum, or largest, value in a selected range. The MAX function is included in the Most Recently Used function category in the Insert Function dialog box, while both the MIN and MAX function can be found in the Statistical category. These functions are particularly useful in larger worksheets.

Unit B
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Copying and Moving Cell Entries

Using the Cut, Copy, and Paste buttons or the Excel drag-and-drop feature, you can copy or move information from one cell or range in your worksheet to another. When you cut or move information, the original data does not remain in the original location. You can also cut, copy, and paste labels and values from one worksheet to another. Jim needs to include the 2003 forecast for spring and fall author events. He's already entered the spring data and will finish entering the labels and data for the fall. He asks you to copy information from the spring report to the fall report.

Steps 1 2 3 4

1. Click the **Spring-Fall sheet tab** of the Author Events Forecast workbook
   The store names in cells A6:A7 are incorrect.

2. Click the **Summer sheet tab**, select the range **A5:A6**, then click the **Copy button** on the Standard toolbar
   The selected range (A5:A6) is copied to the **Office Clipboard**, a temporary storage area that holds the selected information you copy or cut. A moving border surrounds the selected range until you press [Esc] or copy additional information to the Clipboard. The information you copied remains in the selected range.

Trouble?
If the Clipboard task pane does not open, click Edit on the menu bar, then click Office Clipboard.

3. Click the **Spring-Fall sheet tab**, select the range **A6:A7**, click the **Paste button** on the Standard toolbar, select the range **A4:A9**, then click
   The Clipboard task pane opens when you copy a selection to the already-occupied Clipboard. You can use the Clipboard task pane to copy, cut, store, and paste up to 24 items. Each item in the pane displays its contents.

QuickTip
After you paste an item, the Paste Options button appears. If you move the pointer over it, the Paste Options list arrow appears, letting you choose whether to paste the contents or only the formatting.

4. Click cell **A13**, click Boston New York Seattle Houston Total in the Clipboard Task Pane to paste the contents in cell A13, then click the **Close button** in the Task Pane title bar to close it
   The item is copied into the range A13:A18. When pasting an item from the Clipboard into the worksheet, you only need to specify the top-left cell of the range where you want to paste the selection. The Total label in column E is missing from the fall forecast.

5. Click cell **E3**, position the pointer on any edge of the cell until the pointer changes to , then press and hold down **[Ctrl]**
   The pointer changes to the copy pointer .

6. While still pressing **[Ctrl]**, press and hold the **left mouse button**, drag the cell contents to cell **E12**, release the mouse button, then release **[Ctrl]**
   This **drag-and-drop technique** is useful for copying cell contents. As you dragged, an outline of the cell moved with the pointer, as shown in Figure B-11, and a ScreenTip appeared tracking the current position of the item as you moved it. When you released the mouse button, the Total label appeared in cell E12. You can also use drag and drop to move data to a new cell.

Trouble?
When you use drag and drop to move data into occupied cells, Excel asks if you want to replace the existing cells. Click OK to replace the contents with those of the cell you are moving.

7. Click cell **C1**, position the pointer on the edge of the cell until it changes to , then drag the cell contents to **A1**
   You don't use [Ctrl] when moving information with drag and drop. You can easily enter the fall events data into the range B13:D16.

8. Using the information shown in Figure B-12, enter the author events data for the fall into the range B13:D16

9. Click the **Save button** on the Standard toolbar

FIGURE B-11: Using drag-and-drop to copy information

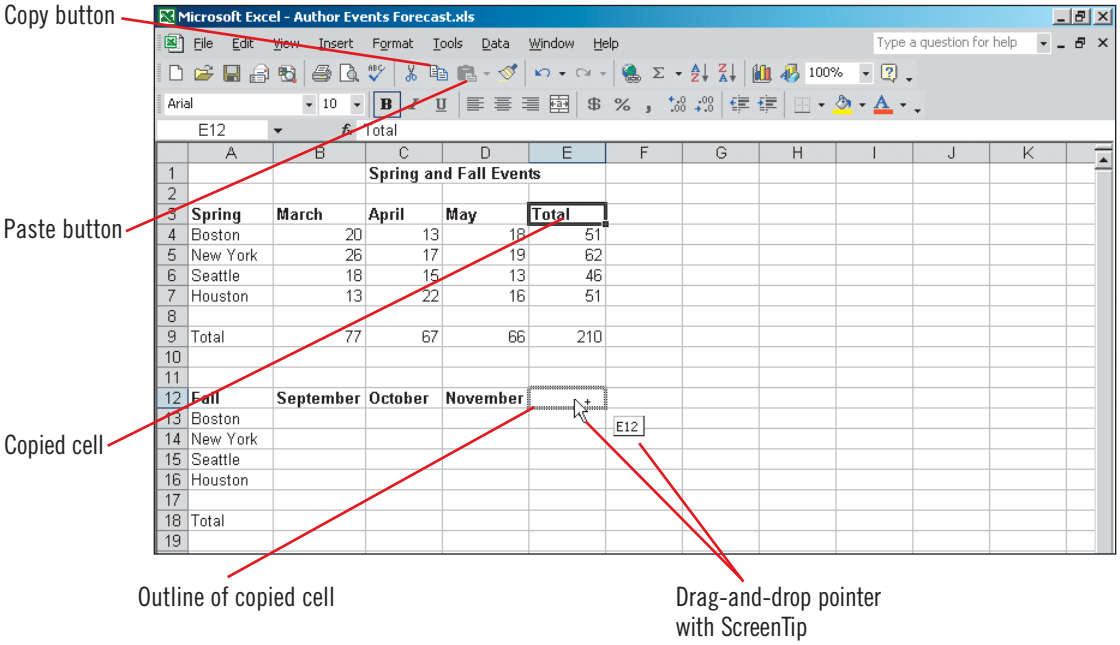
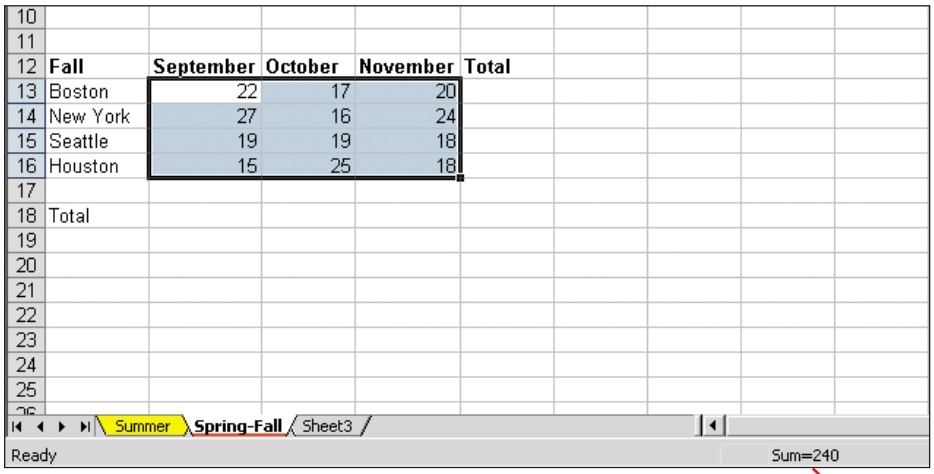


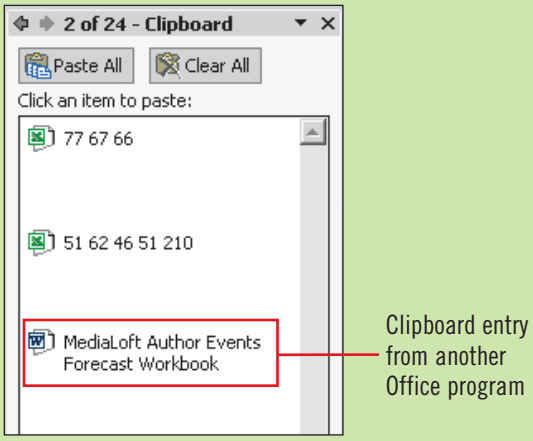
FIGURE B-12: Worksheet with fall author event data entered



Using the Office Clipboard

The Office Clipboard, shown in the task pane in Figure B-13, lets you copy and paste multiple items such as text, images, tables, or Excel ranges within or between Microsoft Office applications. The Office Clipboard can hold up to 24 items copied or cut from any Office program. The Clipboard task pane displays the items stored on the Office Clipboard. You choose whether to delete the first item from the Clipboard when you copy the 25th item. The collected items remain in the Office Clipboard and are available to you until you close all open Office programs. You can specify when and where to show the Office Clipboard task pane by clicking the options list arrow at the bottom of the Clipboard pane.

FIGURE B-13: Office Clipboard task pane



Understanding Relative and Absolute Cell References

As you work in Excel, you will often want to reuse formulas in different parts of the worksheet. This will save you time because you won't have to retype them. For example, you may want to perform a what-if analysis showing one set of sales figures using a lower forecast in one part of the worksheet and another set using a higher forecast in another area. But when you copy formulas, it is important make sure that they refer to the correct cells. To do this, you need to understand relative and absolute cell references. Jim often reuses formulas in different parts of his worksheets to examine different possible outcomes, so he wants you to understand relative and absolute cell references.

Details

Use relative references when cell relationships remain unchanged.

When you create a formula that references other cells, Excel normally does not "record" the exact cell references, but instead the relationship to the cell containing the formula. For example, in Figure B-14, cell E5 contains the formula: =SUM(B5:D5). When Excel retrieves values to calculate the formula in cell E5, it actually looks for "the cell three columns to the left of the formula, which in this case is cell B5", "the cell two columns to the left of the formula" and so on. This way, if you copy the cell to a new location such as cell E6, the results will reflect the new formula location, and will automatically retrieve the values in cells B6, C6, and D6. This is called **relative cell referencing**, because Excel is recording the input cells *in relation to* the formula cell.

In most cases, you will use relative cell references, which is the Excel default. In Figure B-14, the formulas in E5:E9 and in B9:E9 contain relative cell references. They total the "three cells to the left of" or the "four cells above" the formulas.

Use absolute cell references when one relationship changes.

There are times when you want Excel to retrieve formula information from a specific cell, and you don't want that cell to change when you copy the formula to a new location. For example, you might have a price in a specific cell that you want to use in all formulas, regardless of their location. If you used relative cell referencing, the formula results would be incorrect, because Excel would use a different cell every time you copied the formula. Therefore you need to use an **absolute cell reference**, a reference that does not change when you copy the formula.

You create an absolute cell reference by placing a $ (dollar sign) before both the column letter and the row number for the cell's address, using the [F4] function key on the keyboard. Figure B-15 displays the formulas used in Figure B-14. The formulas in cells B15 to D18 use absolute cell references to refer to a potential sales increase of 50%, shown in cell B12.

FIGURE B-14: Location of relative references

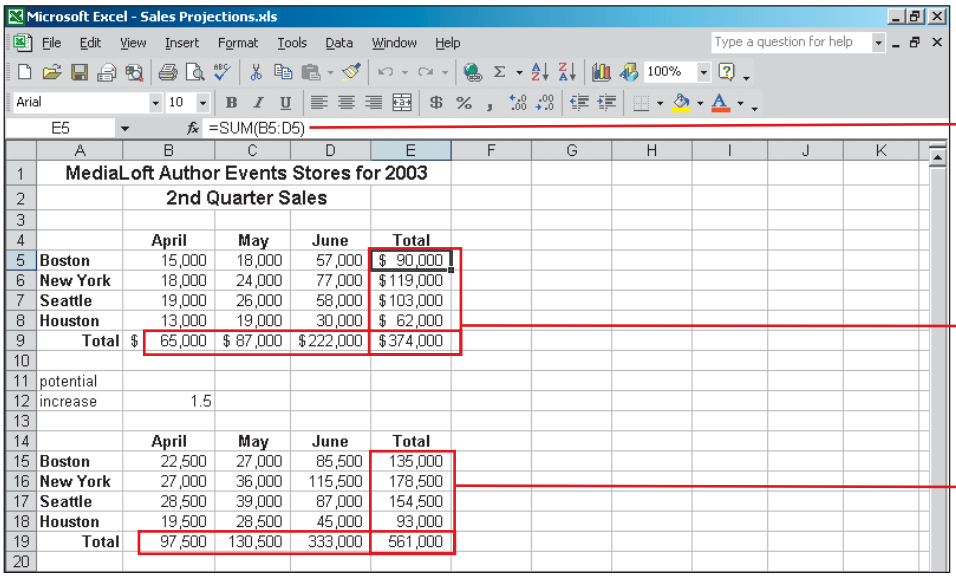
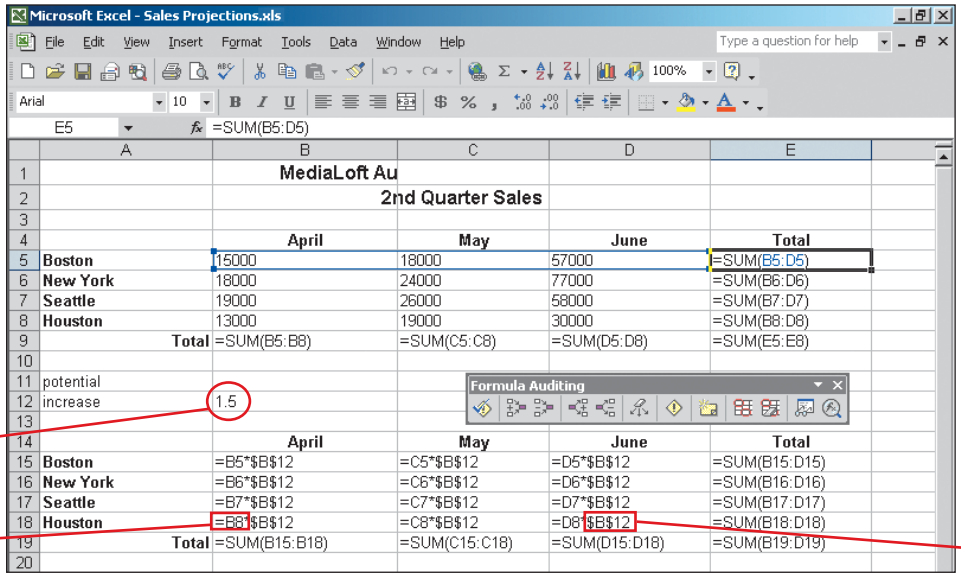


FIGURE B-15: Absolute and relative reference formulas



Using a mixed reference

Sometimes when you copy a formula, you'll want to change the row reference but keep the column reference the same. This type of cell referencing combines elements of both absolute and relative referencing and is called a mixed reference. When copied, the mixed reference C$14 changes the column relative to its new location but prevents the row from changing. In the mixed reference $C14, the column would not change but the row would be updated relative to its location. Like the absolute reference, a mixed reference can be created using the [F4] function key. With each press of the [F4] key, you cycle through all the possible combinations of relative, absolute, and mixed references (C14, C$14, $C14, C14).

Unit B
Excel 2002

Copying Formulas with Relative Cell References

Copying and moving formulas allows you to reuse formulas you've already created. Copying formulas, rather than retyping them, is faster and helps to prevent typing errors. You can use the Copy and Paste commands or the Fill Right method to copy formulas. Jim wants you to copy the formulas that total the appearances by region and by month from the spring to the fall.

Steps 1 2 3 4

1. Click cell **E4**, then click the **Copy button** on the Standard toolbar
   The formula for calculating the total number of spring Boston author events is copied to the Clipboard. Notice that the formula =SUM(B4:D4) appears in the formula bar.

QuickTip

To specify components of the copied cell or range prior to pasting, click Edit on the menu bar, then click Paste Special. You can selectively copy formulas, values, comments, validation, and formatting attributes, and specify calculations, as well as transpose cells or paste the contents as a link.

2. Click cell **E13**, then click the **Paste button** on the Standard toolbar
   The formula from cell E4 is copied into cell E13, where the new result of 59 appears. Notice in the formula bar that the cell references have changed, so that the range B13:D13 appears in the formula. This formula contains **relative cell references**, which tell Excel to copy the formula to a new cell, but to substitute new cell references so that the relationship of the cells to the formula in its new location remains unchanged. In this case, Excel adjusted the formula so that cells D13, C13, and B13—the three cell references immediately to the left of E13—replaced cells D4, C4, and B4, the three cell references to the left of E4. Notice that the bottom-right corner of the active cell contains a small square, called the **fill handle**. You can use the fill handle to copy labels, formulas, and values. This option is called **AutoFill**.
3. Position the pointer over the **fill handle** until it changes to +, press and hold the **left mouse button**, then drag the fill handle to select the range **E13:E16**
   See Figure B-16.
4. Release the mouse button
   A formula similar to the one in cell E13 now appears in the range E14:E16. Again, because the formula uses relative cell references, cells E14 through E16 correctly display the totals for the fall author events. After you release the mouse button, the **AutoFill Options button** appears. If you move the pointer over it and click its list arrow, you can specify what you want to fill and whether or not you want to include formatting.
5. Click cell **B9**, click **Edit** on the menu bar, then click **Copy**

Trouble?

If the Clipboard task pane opens, click the Close button. If the Office Assistant appears, right-click it, then click Hide.

6. Click cell **B18**, click **Edit** on the menu bar, then click **Paste**
   See Figure B-17. The formula for calculating the September events appears in the formula bar. You also need totals to appear in cells C18, D18, and E18. You could use the fill handle again, but another option is to use a menu command.
7. Select the range **B18:E18**
8. Click **Edit** on the menu bar, point to **Fill**, then click **Right**
   The rest of the totals are filled in correctly. Compare your worksheet to Figure B-18.
9. Click the **Save button** on the Standard toolbar

FIGURE B-16: Using the fill handle

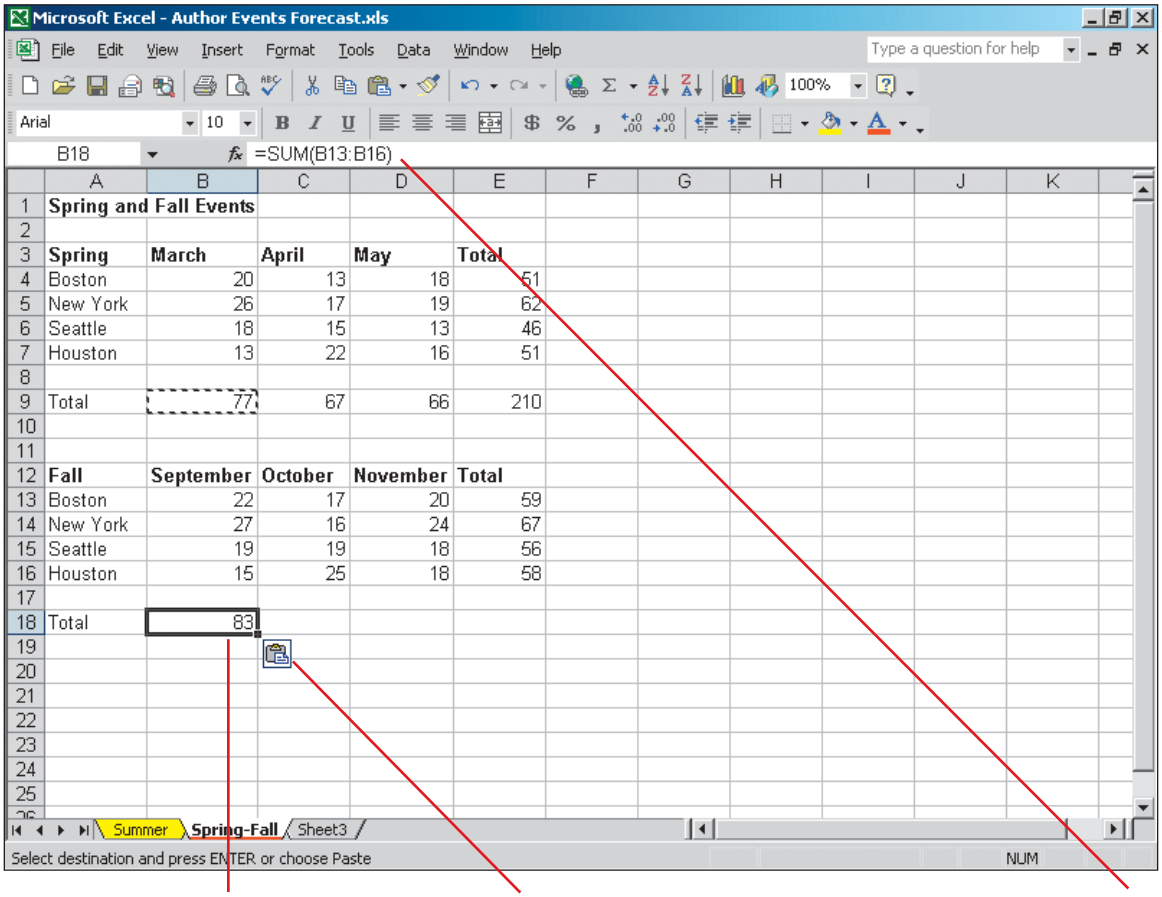
12	Fall	September	October	November	Total
13	Boston	22	17	20	59
14	New York	27	16	24	
15	Seattle	19	19	18	
16	Houston	15	25	18	
17					
18	Total				

Formula in cell E13 will be copied to E14:E16

Fill handle

Mouse pointer

FIGURE B-17: Copied formula



	A	B	C	D	E
1	**Spring and Fall Events**				
2					
3	**Spring**	**March**	**April**	**May**	**Total**
4	Boston	20	13	18	51
5	New York	26	17	19	62
6	Seattle	18	15	13	46
7	Houston	13	22	16	51
8					
9	Total	77	67	66	210
10					
11					
12	**Fall**	**September**	**October**	**November**	**Total**
13	Boston	22	17	20	59
14	New York	27	16	24	67
15	Seattle	19	19	18	56
16	Houston	15	25	18	58
17					
18	Total	83			

Copied formula result

Paste Options button

Copied formula cell references

FIGURE B-18: Completed worksheet with all formulas copied

12	Fall	September	October	November	Total
13	Boston	22	17	20	59
14	New York	27	16	24	67
15	Seattle	19	19	18	56
16	Houston	15	25	18	58
17					
18	Total	83	77	80	240

CLUES TO USE

Filling cells with sequential text or values

Often, you'll need to fill cells with sequential text: months of the year, days of the week, years, or text plus a number (Quarter 1, Quarter 2, . . .). You can easily fill cells using sequences by dragging the fill handle. As you drag the fill handle, Excel automatically extends the existing sequence. (The contents of the last filled cell appear in the ScreenTip.) Use the Fill Series command on the Edit menu to examine all of the available fill series options.

Copying Formulas with Absolute Cell References

When copying formulas, you might want a cell reference to always refer to a particular cell address. In such an instance, you would use an absolute cell reference. An **absolute cell reference** always refers to a specific cell address when the formula is copied. You create an absolute reference by placing a dollar sign ($) before the row letter and column number of the address (for example A1). The staff in the Marketing department hopes the number of author events will increase by 20% over last year's figures. Jim wants you to add a column that calculates a possible increase in the number of spring events in 2003. He asks you to do a what-if analysis and recalculate the spreadsheet several times, changing the percentage by which the number of appearances might increase each time.

Steps 1 2 3 4

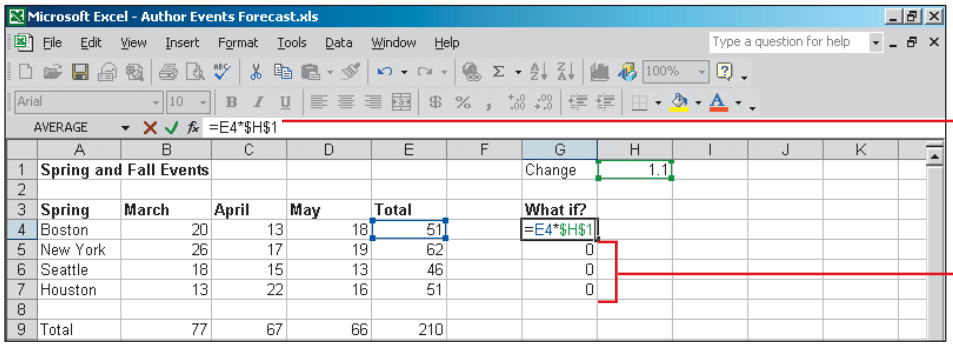
1. Click cell **G1**, type **Change**, then press [→]
   You can store the increase factor that will be used in the what-if analysis in cell H1.
2. Type **1.1**, then press **[Enter]**
   The value in cell H1 represents a 10% increase in author events.
3. Click cell **G3**, type **What if?**, then press **[Enter]**
4. Click cell **G4**, type **=**, click **E4**, type *, click **H1**, then click the **Enter button** on the formula bar
   The result, 56.1, appears in cell G4. This value represents the total spring events for Boston if there is a 10% increase. Jim wants to perform a what-if analysis for all the stores.

QuickTip

Before you copy or move a formula, check to see if you need to use an absolute cell reference.

5. Drag the fill handle to extend the selection from **G4** to **G7**
   The resulting values in the range G5:G7 are all zeros. When you copy the formula it adjusts so that the formula in cell G5 is =E5*H2. Because there is no value in cell H2, the result is 0, an error. You need to use an absolute reference in the formula to keep the formula from adjusting itself. That way, it will always reference cell H1. You can change the relative cell reference to an absolute cell reference by using [F4].
6. Click cell **G4**, press **[F2]** to change to Edit mode, then press **[F4]**
   When you press [F2], the **range finder** outlines the equation's arguments in blue and green. When you press [F4], dollar signs appear, changing the H1 cell reference to an absolute reference. See Figure B-19.
7. Click on the formula bar, then drag the fill handle to extend the selection to range **G5:G7**
   The formula correctly contains an absolute cell reference, and the value of G4 remains unchanged at 56.1. The correct values for a 10% increase appear in cells G4:G7. You complete the what-if analysis by changing the value in cell H1 to indicate a 25% increase in events.
8. Click cell **H1**, type **1.25**, then click
   The values in the range G4:G7 change to reflect the 25% increase. Compare your completed worksheets to Figure B-20. Because events only occur in whole numbers, the numbers' appearance can be changed later.
9. Enter your name in cell **A25**, click the **Save button** on the Standard toolbar, click the **Print button** on the Standard toolbar, close the workbook, then exit Excel

FIGURE B-19: Absolute cell reference in cell G4



	A	B	C	D	E	F	G	H	I	J	K
1	**Spring and Fall Events**						Change	1.1			
2											
3	**Spring**	**March**	**April**	**May**	**Total**		**What if?**				
4	Boston	20	13	18	51		=E4*H1				
5	New York	26	17	19	62		0				
6	Seattle	18	15	13	46		0				
7	Houston	13	22	16	51		0				
8											
9	Total	77	67	66	210						

FIGURE B-20: Completed worksheets

Summer 2003 MediaLoft Author Events Forecast

	June	July	August	Total	Average
Boston	22	15	19	56	18.66667
New York	28	18	22	68	22.66667
Seattle	20	17	18	55	18.33333
Houston	15	19	21	55	18.33333
Total	85	69	80	234	
20% rise	102	82.8	96	280.8	

Spring and Fall Events Change 1.25

Spring	**March**	**April**	**May**	**Total**	**What if?**
Boston	20	13	18	51	63.75
New York	26	17	19	62	77.5
Seattle	18	15	13	46	57.5
Houston	13	22	16	51	63.75
Total	77	67	66	210	

Fall	**September**	**October**	**November**	**Total**
Boston	22	17	20	59
New York	27	16	24	67
Seattle	19	19	18	56
Houston	15	25	18	58
Total	83	77	80	240

Inserting and deleting selected cells

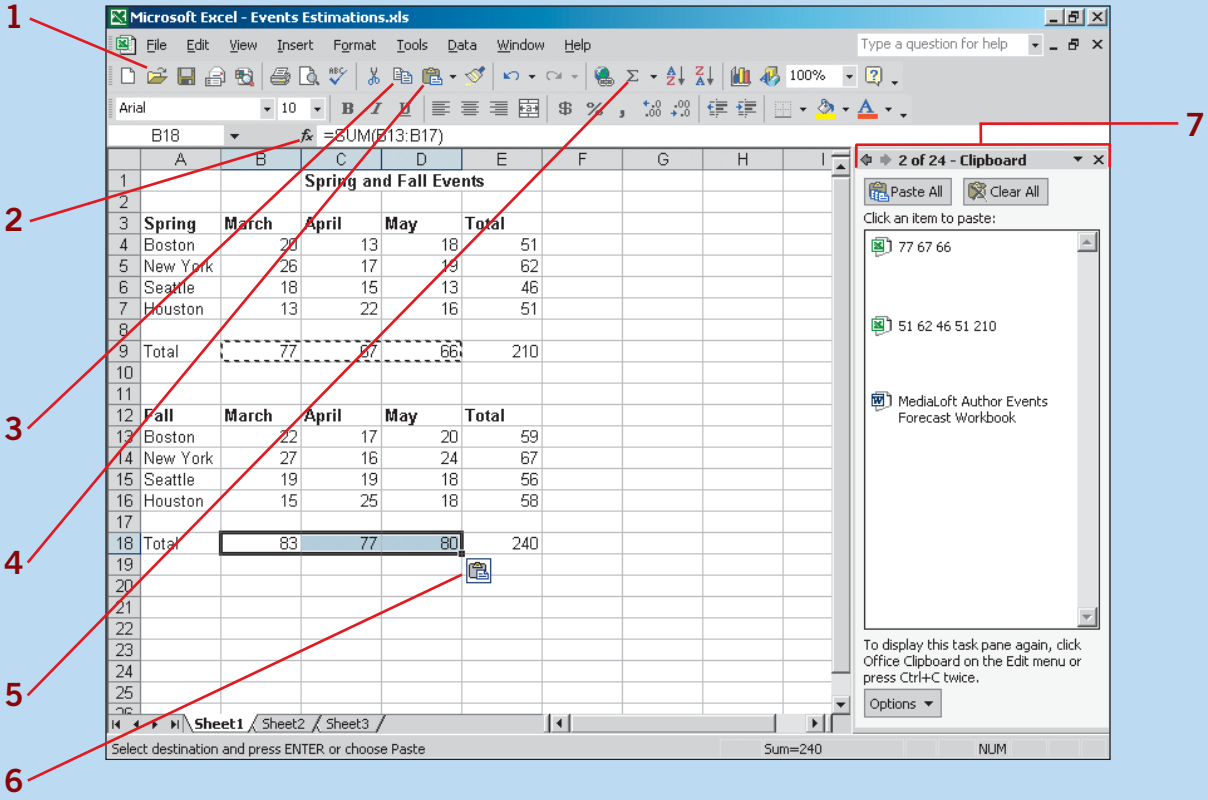
As you add formulas to your workbook, you may need to insert or delete cells, not entire rows or columns. When you do this, Excel automatically adjusts cell references to reflect their new locations. To insert cells, click Insert on the menu bar, then click Cells. The Insert dialog box opens, asking if you want to insert a cell and move the selected cell down or to the right of the new one. To delete one or more selected cells, click Edit on the menu bar, click Delete, and, in the Delete dialog box, indicate which way you want to move the adjacent cells. When using this option, be careful not to disturb row or column alignment that may be necessary to make sense of the worksheet.

Practice

Concepts Review

Label each element of the Excel worksheet window shown in Figure B-21.

FIGURE B-21



Match the term or button with the statement that describes it.

8. Fill handle	a. A predefined formula that provides a shortcut for commonly used calculations
9. Function	b. A cell entry that performs a calculation in an Excel worksheet
10. 	c. Used to copy labels, formulas, and values
11. 	d. Adds the selected range to the Office Clipboard.
12. Formula	e. Used to paste cells

Select the best answer from the list of choices.

13. What type of cell reference changes when it is copied?
    - a. Absolute
    - b. Circular
    - c. Looping
    - d. Relative

14. What character is used to make a reference absolute?
    - a. &
    - b. ^
    - c. $
    - d. @

15. **Which button is used to enter data in a cell?**
    a. 
    c. 
    b. 
    d. 

Skills Review

1. **Edit cell entries and work with ranges.**
   a. Start Excel, open the workbook EX B-2 from the drive and folder where your Project Files are stored then save it as **Office Furnishings**.
   b. Change the quantity of Tables to **27**.
   c. Change the price of Desks to **285**.
   d. Change the quantity of Easels to **18**.
   e. Enter your name in cell A40, then save the workbook.
2. **Enter formulas.**
   a. In cell B6, use the pointing method to enter the formula **B2+B3+B4+B5**.
   b. In cell D2, use the pointing method to enter the formula **B2*C2**.
   c. Save your work.
3. **Create complex formulas.**
   a. In cell B8, enter the formula **(B2+B3+B4+B5)/4**.
   b. In cell C8, enter the formula **(C2+C3+C4+C5)/4**.
   c. Save your work.
4. **Introduce Excel functions.**
   a. Enter the label **Min Price** in cell A9.
   b. In cell C9, enter the function **MIN(C2:C5)**.
   c. Enter the label **Max Price** in cell A10.
   d. Create a formula in cell C10 that determines the maximum price.
   e. Save your work.
5. **Copy and move cell entries.**
   a. Select the range **A1:C6**, then copy the range to cell A12.
   b. Select the range **D1:E1**, then use drag and drop to copy the range to cell D12.
   c. Move the contents of cell G1 to cell E9, then save your work.
6. **Copy formulas with relative cell references.**
   a. Copy the formula in D2 into cells D3:D5.
   b. Copy the formula in D2 into cells D13:D16.
   c. Save the worksheet.
7. **Copy formulas with absolute cell references.**
   a. In cell E10, enter the value **1.375**.
   b. In cell E2, create a formula containing an absolute reference that multiplies D2 and E10.
   c. Use the fill handle to copy the formula in E2 into cells **E3:E5**.
   d. Use the copy and paste buttons to copy the formula in E2 into cells **E13:E16**.
   e. Delete cells A13:E13, shifting the cells up, then edit the formula in cell B16 so the missing reference is removed.
   f. Change the amount in cell E10 to **2.873**.
   g. Select cells A1:E1 and insert cells, shifting cells down.
   h. Enter **Inventory Estimate** in cell A1.
   i. Save, preview, print, and close the workbook, then exit Excel.

Independent Challenge 1

You are the box office manager for the Young Brazilians Jazz Band, a popular new group. Your responsibilities include tracking seasonal ticket sales for the band's concerts and anticipating ticket sales for the next season. The group sells four types of tickets: reserved, general, senior, and student tickets.

The 2003–2004 season includes five scheduled concerts: Spring, Summer, Fall, Winter, and Thaw. You will plan and build a worksheet that tracks the sales of each of the four ticket types for all five concerts.

FIGURE B-22

	A	B	C	D	E	F	G	H
1			2003-2004 Season					
2			Young Brazilians Jazz Band					Increase
3								1.05
4		Reserved	General	Senior	Student			
5	Concerts	Seating	Admission	Citizens	Tickets	Totals		What if?
6	Spring	285	50	30	20	385		404.25
7	Summer	135	25	35	20	215		225.75
8	Fall	130	50	25	20	225		236.25
9	Winter	160	100	30	20	310		325.5
10	Thaw	250	60	35	20	365		383.25
11	Total	960	285	155	100	1500		1575

a. Think about the results you want to see, the information you need to build into these worksheets, and what types of calculations must be performed.

b. Sketch sample worksheets on a piece of paper to indicate how the information should be laid out. What information should go in the columns? In the rows?

c. Start Excel, open a new workbook, then save it as **Young Brazilians** in the drive and folder where your Project Files are stored.

d. Plan and build a worksheet that tracks the sales of each of the four ticket types for all five concerts. Build the worksheets by entering a title, row labels, column headings, and formulas.

e. Enter your own sales data. No concert sold more than 400 tickets, and the Reserved category was the most popular.

f. Calculate the total ticket sales for each concert, the total sales for each of the four ticket types, and the total sales for all tickets.

g. Name the worksheet **Sales Data** and color the tab Red.

h. Copy the Sales Data worksheet to a blank worksheet, name the copied worksheet **5% Increase**, and color the tab aqua.

i. Modify the 5% increase sheet so that a 5% increase in sales of all ticket types is shown in a separate column. See Figure B-22 for a sample worksheet.

j. Enter your name in a worksheet cell.

k. Save your work, preview and print the worksheets, then close the workbook and exit Excel.

Independent Challenge 2

The Beautiful You Salon is a small but growing beauty salon that has hired you to organize its accounting records using Excel. The owners want you to track its expenses using Excel. Before you were hired, one of the bookkeepers entered last year's expenses in a workbook, but the analysis was never completed.

a. Start Excel, open the workbook EX B-3 then save it as **Beautiful You Finances** in the drive and folder where your Project Files are stored. The worksheet includes labels for functions such as the Average, Maximum, and Minimum amounts of each of the expenses in the worksheet.

b. Think about what information would be important for the bookkeeping staff to know.

c. Create your sketch using the existing worksheet as a foundation.

d. Create formulas in the Total column and row using the AutoSum function.

e. Create formulas in the Average, Maximum, and Minimum columns and rows using the appropriate functions, dragging to select the range.

f. Rename Sheet1 **Expenses** and add a color to the tab.

g. Enter your name in a worksheet cell.

h. Save your work, preview and print the worksheet, then close the workbook and exit Excel.

Independent Challenge 3

You have been promoted to computer lab manager at Learn-It-All, a local computer training center. It is your responsibility to make sure there are enough computers for students during scheduled classes. Currently, you have five classrooms: four with IBM PCs and one with Macintoshes. Classes are scheduled Monday, Wednesday, and Friday in two-hour increments from 9 a.m. to 5 p.m. (the lab closes at 7 p.m.), and each room can currently accommodate 30 computers.
You plan and build a worksheet that tracks the number of students who can currently use the available computers per room. You create your enrollment data. Using an additional worksheet, you show the impact of an enrollment increase of 25%.

a. Think about how to construct these worksheets to create the desired output.
b. Sketch sample paper worksheets to indicate how the information should be laid out.
c. Start Excel, open a new workbook, then save it as **Learn-it-All** in the drive and folder where your Project Files are stored.
d. Create a worksheet by entering a title, row labels, column headings, data, and formulas. Name the sheet to easily identify its contents.
e. Create a second sheet by copying the information from the initial sheet.
f. Name the second sheet to easily identify its contents.
g. Add color to each sheet tab.
h. Enter your name in a cell in each sheet.
i. Save your work, preview and print each worksheet, then close the workbook and exit Excel.

Independent Challenge 4

Your company is opening a branch office in Great Britain and your boss is a fanatic about keeping the thermostats at a constant temperature during each season of the year. Because she grew up in the U.S., she is only familiar with Fahrenheit temperatures and doesn't know how to convert them to Celsius. She has asked you to find out the Celsius equivalents for the thermostatic settings she wants to use. She prefers the temperature to be 65 degrees F in the winter, 62 degrees F in the spring, 75 degrees in the summer, and 70 degrees F in the fall. You can use the Web and Excel to determine the new settings.

a. Start Excel, open a new workbook, then save it as **Temperature Conversions** in the drive and folder where your Project Files are stored.
b. Go to the Alta Vista search engine at www.altavista.com and enter search text such as "temperature conversions". You can also use Yahoo!, Excite, Infoseek, or another search engine of your choice. Locate a site that tells you how to convert Fahrenheit temperatures to Celsius. (*Hint*: One possible site you can use to determine these conversions is http://home.clara.net/brianp/, then click on the Temperature link.)
c. Think about how to create an Excel equation that will perform the conversion.
d. Create column and row titles using Table B-3 to get started.
e. In the appropriate cell, create an equation that calculates the conversion of a Fahrenheit temperature to a Celsius temperature.
f. Copy the equation, then paste it in the remaining Celsius cells.
g. Enter your name in a worksheet cell.
h. Save and print your work.

TABLE B-3

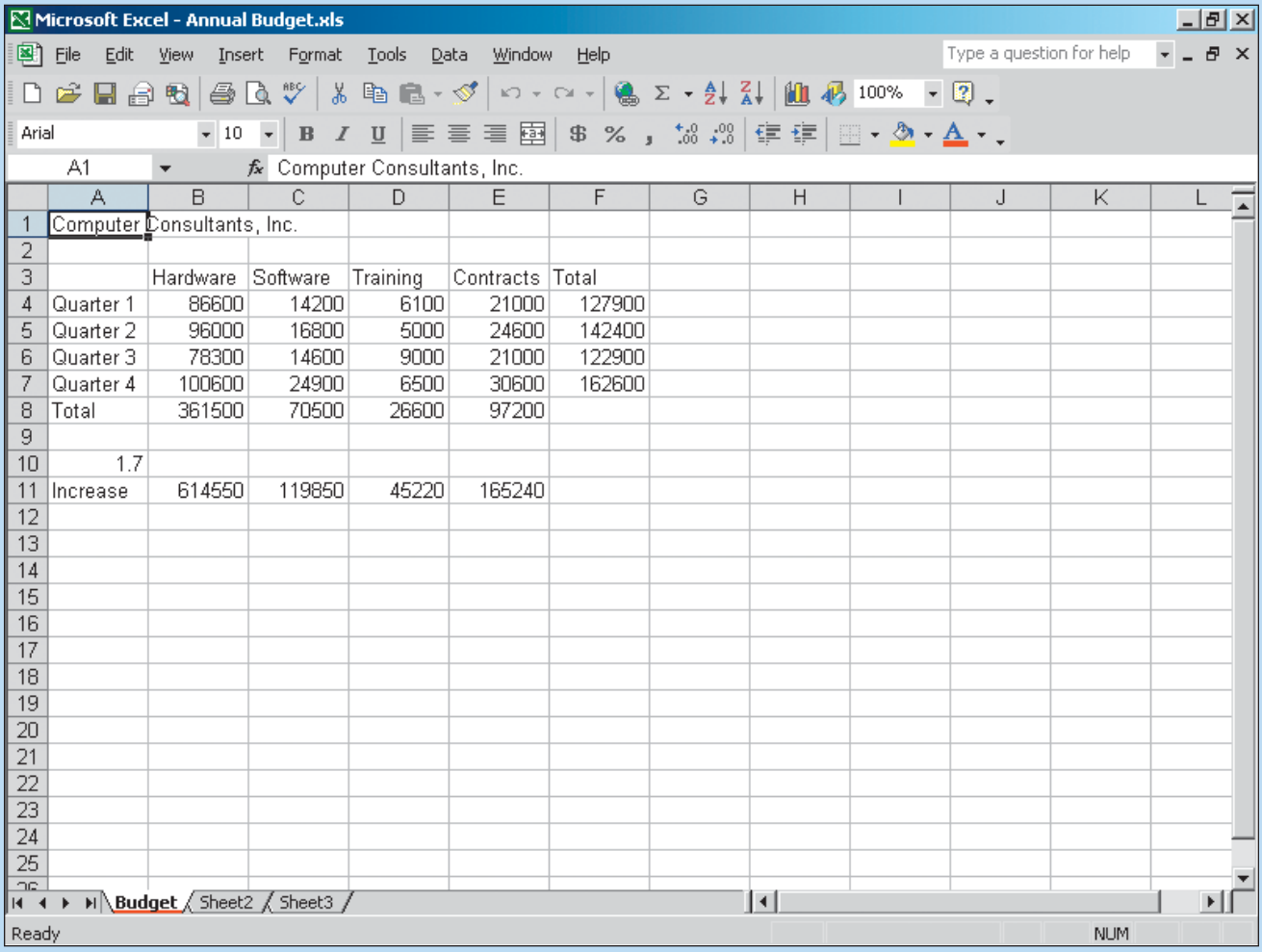
Temperature Conversions

Season	Fahrenheit	Celsius
Spring	62	
Winter	68	
Summer	75	
Fall	70	

Visual Workshop

Create a worksheet similar to Figure B-23 using the skills you learned in this unit. Save the workbook as **Annual Budget** in the drive and folder where your Project Files are stored. Enter your name in cell A13, then preview and print the worksheet.

FIGURE B-23



	A	B	C	D	E	F
1	Computer Consultants, Inc.					
2						
3		Hardware	Software	Training	Contracts	Total
4	Quarter 1	86600	14200	6100	21000	127900
5	Quarter 2	96000	16800	5000	24600	142400
6	Quarter 3	78300	14600	9000	21000	122900
7	Quarter 4	100600	24900	6500	30600	162600
8	Total	361500	70500	26600	97200	
9						
10	1.7					
11	Increase	614550	119850	45220	165240	